SMALL NAVIGATION PROJECT

BUCKS HARBOR

MACHIASPORT, MAINE

DETAILED PROJECT REPORT

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

JANUARY 1971

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

IN REPLY REFER TO:
NEDED-R

18 January 1971

SUBJECT: Detailed Project Report for Small Navigation Project, Bucks Harbor, Machiasport, Maine

Chief of Engineers
ATTN: ENGCW-PD

1. In accordance with ER 1165-2-14, there is submitted for review and comment an advance draft of the subject report.

2. Responsible officials of the State of Maine and the town of Machiasport concur in the recommended project and have given firm indications that the requirements of local cooperation would be met. Appendix B of the report contains letters to this effect. Formal assurances of participation will be obtained from the State and town during preparation of final design of the project.

3. The plans and specifications will be prepared in accordance with the Detailed Project Report as approved. Funds in the amount of $18,000 for preparation of the plans and specifications and $229,000 for construction will be required. As benefits are general in nature, no local cash contribution will be required.

4. A draft of the environmental statement has been sent to appropriate Federal, State and local agencies. Twelve copies are inclosed. The final statement, including any pertinent comments, will be forwarded as soon as they are received.

5. Formal comments of the Governor of Maine will be requested after approval of the advance draft.

2 Incl
as (12 cys)

FRANK P. BANE
Colonel, Corps of Engineers
Division Engineer

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
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PERTINENT DATA

1. Purpose. To provide an anchorage adequate for the entire fleet to moor safely during storm conditions without having to seek shelter elsewhere.

2. Location. Eight miles south of Machias, Maine, 90 miles east of Bangor, Maine.

3. Existing Project. There is no existing Federal project at Bucks Harbor, Maine.

4. Improvement Desired. 12-acres of anchorage, 8 feet deep.

5. Recommended Improvement. Eleven acres of anchorage, eight feet deep, extending from the southerly side of Bucks Neck about 1,450 feet along the westerly side of the harbor, southeasterly toward Bucks Head.

6. Estimated Project Cost.

Dredging 11-acres of anchorage, 8 feet deep 48,200 c.y. of mud and gravel @ $3.80/c.y.	$ 183,000
Contingencies	27,000
Engineering and Design	18,000*
Supervision and Administration	19,000
Construction Total	$ 247,000

*Excludes project study cost of $22,500.

7. Apportionment of First Cost

Federal:	
Corps of Engineers dredging	$ 247,000
Non-Federal:	
public landing	10,000
Total Cost	$ 257,000

8. Annual Cost (All Federal)

Interest and Amortization	
50 years @ 5-1/8%: 0.0558 x $247,000	$ 13,800
Maintenance: anchorage	7,700
Total Annual Charges	$ 21,500

9. Benefits

Reduction of damages from:	
Storms	$ 2,000
Ice Floes	3,000
Reduction of Storm and Tidal Delays	18,100
Redevelopment Benefits	800
Total	$ 23,900

10. Benefit-cost Ratio: $23,900/$21,500 = 1.11

11. Requirements of Local Cooperation.

a. Provide, maintain and operate without cost to the United States, a public landing with adequate parking area and supply facilities open to all on equal terms;

b. Provide and maintain access channels to and berthing areas at all wharves adjacent to the proposed anchorage, with depths commensurate with those in the anchorage;

c. Hold and save the United States free from all damages which may result from the construction and subsequent maintenance of the project;

d. Provide without cost to the United States all lands, easements and rights-of-way required for construction and subsequent maintenance of the project;

e. Regulate the use, growth and free development of the harbor facilities with the understanding that they will be open to all on equal terms;

f. Establish regulations prohibiting discharge of untreated sewage, garbage and other pollutants in the waters of the harbor by users thereof, which regulations shall be in accordance with applicable laws or regulations of Federal, State and local authorities responsible for pollution prevention and control.

BUCKS HARBOR, MACHIASPORT, MAINE

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DETAILED PROJECT REPORT
SMALL NAVIGATION PROJECT
BUCKS HARBOR, MACHIASPORT, MAINE

AUTHORITY

1. This report is submitted under authority of Section 107 of the River and Harbor Act of 1960, as amended in 1965. Specific authority was provided by 1st Indorsement dated 19 September 1969 from the Chief of Engineers in reply to a letter from the Division Engineer, New England Division, dated 30 July 1969 recommending the study.

PURPOSE AND EXTENT OF STUDY

2. The study was made to determine the need and economic justification for a Federal navigation project in Bucks Harbor, Maine. A public hearing was held at Bucks Harbor on 3 April 1968 to determine what improvements local interests wanted. Commercial statistics, available maps and other background data were studied. Engineering studies included field surveys of the hydrography, wave analysis, optimum design of anchorage areas, and dredging quantity calculations. Local, State and Federal agencies having a direct interest in the study were consulted regarding effects on area ecology and commercial fishing.

DESCRIPTION

3. Bucks Harbor is a narrow inlet containing about 90 acres on the west side of Machias Bay, Maine. It is 21 miles southwest of West Quoddy Head near the Canadian border and 2.5 miles south of the Machias River mouth. The portion known as the outer harbor extends 0.75 miles south and southwest of Bar Island. There is an exposed natural anchorage with depths of 8 to 15 feet located at the harbor entrance between Bar Island on the north and Bucks Head on the south. Shallow water, less than

6 feet deep at mean low water, comprises most of the harbor. Mudflats cover the northern section. There is an additional narrow inlet, known as the inner harbor, most of which is above mean low water. It extends 1,500 feet farther inland to the west, then 1,000 feet north to a footbridge connecting the village of Bucks Harbor with Bucks Neck. The shoreline throughout the area is rocky or gravelly and in places, rises abruptly from the water. The mean tide range and spring tide range are 12.5 feet and 14.2 feet, respectively. The area is shown on U. S. Coast and Geodetic Chart 304, U. S. Geological Survey maps (Machias and Machias Bay Quadrangles), and the maps accompanying the report.

TRIBUTARY AREA

4. The area immediately tributary to Bucks Harbor includes the towns of Machiasport and Machias. Machiasport contains several small developed areas including the village of Bucks Harbor, at the head of the harbor. The population of this sparsely settled town decreased 11% during the 1960's, from 980 to 871. Residents of Machiasport are employed in lobster fishing, scallop dragging and long lining for groundfish. The town of Machias is larger than Machiasport and is the economic center of Washington County. The population of Machias fell 7.6% from 2,614 in 1960 to 2,415 in 1970. Industry in Machias includes textiles, lumber, canning and other small industry. Because of persistently high unemployment, Washington County, which includes Bucks Harbor, has been designated a Redevelopment Area in accordance with Public Law 89-136, the Public Works and Economic Development Act.

5. Trawlers from other ports often use the outer harbor for anchorage when trawling for groundfish in Machias Bay. Purse seiners call occasionally to pick up fish for Port Clyde, Maine. The harbor is almost never used by recreational craft because of its remote location and the lack of appropriate shore facilities.

6. There are no long distance transportation facilities at Bucks Harbor. U. S. Route 1, the major coastal highway, passes through Machias, 8 miles to the north. Machias also has passenger bus service and rail freight service to all points, and an airfield with no regularly scheduled flights.

BRIDGES AFFECTING NAVIGATION

7. There are no bridges that affect the use of the considered improvements.

EXISTING PROJECTS

8. There is no existing Federal navigation project at Bucks Harbor. The nearest Federal project is at Machias River, five miles north of Bucks Harbor. It was adopted and completed in 1873 and provides for a channel six feet deep and not less than 100 feet wide from deep water near East Machias Bridge to the wharves at Machias. No local cooperation was required. Federal cost for construction was $32,000 and to date, maintenance has cost $32,666. The project was constructed to handle coal and lumber shipping. This type of commerce is no longer a factor at Machias. The only waterborne commerce now is fresh fish. Approximately 300 tons were landed by shallow draft vessels in 1969. Local interests asked for maintenance of the channel in recent years for these vessels and for a small fleet of pleasure boats. However, maintenance has not been accomplished to date due to difficulty in finding a spoil disposal site. Shorefront facilities at Machias are practically non-existent and are about 4 miles upstream of the canneries at Machiasport. The river channel is narrow and winding and leads through flats that are mostly bare at low water. Bucks Harbor is well protected from storms and is only about three miles south of the canneries at Machiasport. Therefore, development of Bucks Harbor is independent of and more logical than development of Machias River. As a result, the channel in Machias River has shoaled to a controlling depth of two or three feet at mean low water.

OTHER IMPROVEMENTS

9. The only improvements in Bucks Harbor are five timber wharves, constructed by local interests.

TERMINAL AND TRANSFER FACILITIES

10. There are five timber pile wharves at Bucks Harbor. Two are in the outer harbor, one on the south shore and one on Bucks Neck, the northwest shore. Both outer harbor wharves are owned and operated by lobster dealers, and have depths of four to six feet alongside. Lobstermen load bait and take on fuel at these landings. But, they load their traps and other gear at various places along the shore to avoid tying up the float landings for long periods. The other three wharves are small timber structures located in the inner harbor and accessible only during high tide. The one on the west side of Bucks Neck is a town wharf.

IMPROVEMENTS DESIRED

11. A public hearing was held on 3 April 1968 at Bucks Harbor, Maine. Sixty people attended including representatives of State and local governments, the fishing industry, business interests and others. Local interests stated that they need an anchorage area of 40 acres, 10 feet deep in the outer harbor. A reconaissance study showed the request to be economically infeasible. Instead, a smaller anchorage, about 12 acres, 8 feet deep near the westerly shore was proposed. Local interests stated that such an anchorage would be adequate for their needs.

EXISTING AND PROSPECTIVE COMMERCE

12. The 44 fishing boats permanently based at Bucks Harbor had total landings during 1967 valued at $183,000. TABLE 1 shows a breakdown of the landings.

TABLE 1

Commodity	Quantity	Value
Lobsters	180,000 lbs.	$ 160,000
Clams	-	18,000
Scallops	-	3,000
Halibut	4,000 lbs.	1,200
Cod & Haddock	12,000 lbs.	800
	Total	$ 183,000

In addition, shrimp dragging started in the winter of 1968-1969. Some of the lobster boats rig for shrimp and operate on a full time basis for several months during late winter and early spring. Local interests feel it holds much promise. However, the catch during the winter of 1969-1970 was insignificant and it is questionable whether this type of fishing will become an integral part of the local fishing industry.

13. Local interests feel that dredging an adequate anchorage in the outer harbor will prevent many delays and help to increase the catch of all types of fish. The U.S. Fish and Wildlife Service estimates that as a result of providing adequate deep anchorage, the annual catch will increase as follows:

Lobster	-	20,000 lbs.	-	$ 16,000
Scallops	-	4,800 lbs.	-	3,600
Groundfish	-	30,000 lbs.	-	2,000
		Total		$ 21,600

It is not expected that the fleet size will increase due to the improvements. Although Washington County experiences high unemployment rates, people of the village of Bucks Harbor and the immediate vicinity are now fully employed in the fishing industry.

14. There is a fish processing plant at Machiasport. Boats serving this plant do not use Bucks Harbor except during winter when ice conditions sometimes prevent them from reaching the plant.

15. Some local interests propose to establish a school at Cross Island, three miles out in Machias Bay. They feel that Bucks Harbor would be the most convenient place for their mainland terminal for supply and transportation operations and for refuge in storms. They would need depths of eight feet or greater.

VESSEL TRAFFIC

16. There are no statistics of vessel trips in the harbor. At present, there are 40 lobster boats operating from the harbor, only 28 of which are active during the winter. Also, four scallop draggers are based there. Occasionally, several herring boats visit the harbor to pick up local fish catches. The permanent fleet comprises the following boats:

Type	Number	Length	Draft
Lobster-outboard	6	16-20'	1'
Lobster	1	25'	1½'
Lobster	33	30-35'	2-2½'
Dragger	4	35-45'	3½'
Total	44		

DIFFICULTIES ATTENDING NAVIGATION

17. Most moorings in Bucks Harbor are along the westerly shore where the depth at low water is five to six feet. This is adequate except during storm conditions or extreme low tide. The harbor is exposed to southeasterly storms which occur mostly during the best lobster fishing season, September through November. Occasionally, when boats moor close to the inner harbor and a very low tide occurs, they ground out. This delays departures and reduces fishing time.

18. Boats caught on their moorings at low water during southeasterly storms are subject to damage. Under existing conditions, they hit bottom or swing into each other. It is the consensus of local fishermen that the problem could be eliminated by expanding and deepening the anchorage. This would provide for a margin of safety against striking bottom, widen the distance between boats and allow for setting better ground tackle to prevent boats from winding up their moorings. To reduce the possibility of storm damage, fishermen take their boats to the inner harbor and allow them to ground out on the tide. This is done about 24 hours before a storm is due. They stay there during the storm and very often the day after, awaiting high tide to float them free. Sometimes the tide is too late in the day for the men to work their traps, so another day is lost.

19. During the winter, ice forms on the mudflats along the northwesterly shore. Strong winds and tidal action break it up into floes which drift into the outer harbor, causing damage to the boats operating there. Due to the lack of depth in the outer harbor, the Coast Guard ice breaker cannot enter the harbor to break up floes.

20. At the public hearing, local interests requested a 40-acre anchorage, 10 feet deep in the outer harbor. A reconnaissance study was made to determine whether a detailed study was justified. The reconnaissance study showed that a 40-acre anchorage was much too costly to justify. It recommended a smaller anchorage, about 12 acres, which would safely accommodate the fleet during storm conditions and could be economically justified. These recommendations were checked and refined.

21. To determine the extent of anchorage required, the size of the fleet at the end of the 50-year project life had to be estimated. The major factors affecting such an estimate are the economic prospects of the fishing industry, particularly lobsters, and the manpower available to increase the size of the fishing fleet, if economics warrant it.

22. Normally, lobsters are consumed in restaurants rather than at home. With increased affluence and spare time, people have been eating at restaurants more often, causing an increased demand for lobsters. TABLE 2 shows the comparative lobster catch for New England.

TABLE 2

NORTHERN LOBSTER CATCH IN NEW ENGLAND
(Thousands of Pounds)

1968 - 30,033	1963 - 29,120	1958 - 25,873
1967 - 24,766	1962 - 28,286	1957 - 29,106
1966 - 28,006	1961 - 25,931	1956 - 25,171
1965 - 28,530	1960 - 29,260	1955 - 27,624
1964 - 29,318	1959 - 27,393	1954 - 26,433

23. The size of the catch has fluctuated widely during the past 15 years, but has remained between 25 and 30 million tons. There has apparently been no significant increase in the lobster catch. Hence, with fishing methods being essentially unchanged, it is reasonable to assume that no significant change in the fleet size has occurred. What is true for New England is not necessarily true for each individual harbor. However, local officials stated that the fleet size had not changed appreciably within their span of memory.

24. The rather stable supply of lobsters combined with the increased demand during recent years has caused unit prices to rise considerably.

25. The population of both Machiasport and Machias has dropped during the past ten years, 1960-1970, 11.1% and 7.6% respectively. During the 1950's, population of both towns had increased about 25% Prior to that, since the turn of the century, Machiasport had been losing steadily, while Machias had been quite stable. TABLE 3 shows the comparative population statistics.

TABLE 3

COMPARATIVE POPULATION STATISTICS

	1970	1960	1950	1940	1930	1920	1910	1900
Machiasport	871	980	781	818	825	1,117	1,218	1,218
Machias	2,415	2,614	2,063	1,954	1,853	2,152	2,089	2,082

26. Economics of the lobster industry indicates an increase in the number of lobstermen due to attractive prices resulting from the high demand for and short supply of lobsters. However, as young people from the area are being attracted to more metropolitan areas, the labor force available to add to the local fishing fleet is reduced. Therefore, the size of the local fishing fleet is expected to remain more or less constant with good prices on the one hand being offset by lack of manpower on the other hand.

27. The existing fleet contains 44 boats, so the anchorage must be designed to accommodate that many vessels.

28. The minimum depth of anchorage was estimated to be eight feet as follows:

Maximum wave amplitude	2.0 feet
Maximum draft	3.5 feet
Pitch and roll allowance	1.5 feet
Nominal bottom clearance	1.0 feet
Total Depth Required	8.0 feet

28a. The wave height of four feet (amplitude of two feet) was determined by two methods. First, assuming a fully arisen sea as follows:

Fetch	=	unlimited
Wind	=	40 mph
Duration	=	unlimited

The design wave has the following characteristics:

Height	=	30 feet
Period	=	10 seconds
Length	=	512 Feet (deep water)

Such a wave approaching from due east would be refracted around Cross Island and enter Machias Bay from the southeast. By the time it reached Bucks Harbor and was refracted around Bucks Head, waves of four feet would result in the proposed anchorage area.

28b. The second approach was using the Thijsse and Schijf method for forecasting shallow water waves as described in their paper, "Penetration of Waves and Swells into Harbours", published in "Proceedings of XVIIth International Navigation Congress", Section II, Ocean Navigation Communication IV, Lisbon, 1949. Using a wind speed of 45 mph, a fetch of three miles (southeasterly to Cross Island), and a mean depth in the fetch of 60 feet, a 4.2 foot wave results at the harbor entrance. This would be refracted to less than four feet at the anchorage area. Hence, the worst condition would be a four foot wave in the anchorage area.

No allowance was made for drag or squat because at the critical conditions of wave height and tide stage, the boats would be at their moorings and not under way.

29. The area necessary to moor each boat safely varies with the type of mooring used, the boat size, tide range, depth of water, storm surge, wind and wave action and strength of currents. For single point mooring with overlapping circles, an eight foot anchorage in Bucks Harbor would accommodate five boats per acre. Allowing two acres for maneuvering fairway, a fleet of 44 boats would require an 11-acre anchorage.

30. Various locations for the anchorage were considered. An anchorage in the inner harbor or in the mudflats north of Bucks Neck would require too much dredging to be economically justified. An anchorage in the middle of the outer harbor would require very little dredging, but would be exposed to southeasterly storms and would be too remote from the existing landings. Accordingly, the anchorage was located along the west side of the outer harbor running between the two existing wharves where the catch is normally landed. This area is in the lee of Bucks Head during southeasterly storms. The configuration of the anchorage was based on the minimum amount of dredging required to meet the criteria of proximity to shore for optimum storm protection, accessibility from existing wharves, and adequate size to accommodate the existing fleet.

PLAN OF IMPROVEMENT

31. The proposed plan of improvement consists of an 11-acre anchorage and fairway channel to a depth of eight feet below mean low water. It would extend from near the inner harbor entrance just off the Sprague and Look Wharf, 200 feet wide for a distance of 800 feet southeasterly toward Bucks Head. It would continue along the westerly shore of the outer harbor 585 feet wide tapering to 525 feet wide for a distance of 650 feet to just off the Millard Urquhart Wharf. From there it would taper off to 200 feet wide, 150 feet farther southeasterly. The anchorage would extend to water with eight foot natural depths so that no entrance channel would be required. Local interests would provide a public landing and dredge berths and access channels to the anchorage. Other details of local cooperation are discussed in Paragraph 48.

WATER POWER AND OTHER SPECIAL SUBJECTS

32. There are no problems pertaining to water power, flood control or related subjects.

33. Bucks Harbor is virtually free from pollution. Small amounts of oil and exhaust from fishing boats get into the water, but tidal action keeps the harbor flushed clean of these pollutants. The project will have no long term effect on the environment. There will be temporary disruption of marine life in the dredging area and in the disposal area, but the extent of the dredging and the nature of the spoil and bottom material is such that the natural environment would quickly reestablish itself when the project is completed. The dredging would also cause a temporary turbid condition in the harbor. This will disappear shortly after project completion.

34. The U. S. Fish and Wildlife Service reports that the mudflats of the inner harbor and those north and east of Bucks Neck are highly productive soft clam areas and should not be used for spoil disposal. It advises using an offshore disposal area. If this is done, the improvement would have no adverse effects on fish and wildlife. The method of dredging would be by dipper or clam shell dredge with loading into scows for disposal at the site shown in Figure 1. Based on EPA guideline criteria, the spoil material is suitable for ocean disposal as indicated by the letter from EPA in Appendix B. Letters of concurrence with the Environmental Impact Statement which discusses dredging and disposal operations in detail are also included in Appendix B.

SHORELINE CHANGES

35. The shoreline of Bucks Harbor is very stable and rocky, typical of the Maine coast. Areas that are not ledge are comprised of coarse gravel and mud. The proposed anchorage would in no way change the existing shoreline.

REQUIRED AIDS TO NAVIGATION

36. The Commander, First Coast Guard District, has advised that no aids to navigation would be required in the harbor. His comments are included in APPENDIX B.

ESTIMATES OF FIRST COSTS

37. Federal construction under the proposed plan of improvement would consist of dredging an anchorage of 11 acres to a depth of eight feet below mean low water with an allowance of one foot for overdepth and side slopes of one vertical on three horizontal. The dredging comprises 48,200 cubic yards of mud and gravel. It would be removed by bucket dredge with disposal in an approved offshore dumping ground. Quantities were estimated from soundings made by the Corps of Engineers and shown on PLATE 2.

38. The unit cost of $3.80 per cubic yard was based on November 1970 price levels for similar work. An allowance for contingencies was made.

Project Cost Estimates

Cost Acct. No.	Item	
09	Dredging 48,200 c.y. @ $3.80	$ 183,000
	Contingencies	27,000
	Total	$ 210,000
30	Engineering & Design	18,000
31	Supervision & Administration	19,000
		$ 247,000
	Public Landing (Self-liquidating)	10,000
	Total Project Cost (Federal and Non-Federal)*	$ 257,000

*Exclusive of $22,500 project study costs.

ESTIMATE OF ANNUAL CHARGES

39. Annual charges for the navigation improvement have been computed on the basis of a 50-year project life with a Federal interest rate of 5-1/8%. Maintenance costs are based on an average

shoaling rate of 1,800 cubic yards per year. This was determined from comparative surveys of several similar, nearby existing Federal anchorages. The cost of providing a public landing, including access channels and berthing areas are considered self-liquidating and are not included in the estimate of annual charges.

Annual Charges

Interest and Amortization ($247,000 x 0.0558)	$ 13,800
Maintenance Dredging - 1,800 c.y. @ $4.30	7,700
Total Project Annual Charges	$ 21,500

ESTIMATE OF BENEFITS

40. Southeasterly storms cause boats anchored in the outer harbor to drag moorings, go aground, or collide with each other. Annual storm damages have averaged $2,000 for the past 10 years. To avoid damage, many fishermen move their boats to the inner harbor on the day before a storm is expected to strike. They remain there during the storm and float free at high tide on the following day. Often, high tide arrives too late in the day for the men to tend their traps, so another day is lost. Since the day of the storm would be lost regardless of the anchorage conditions, lack of adequate anchorage results in one or two days lost fishing time each time a southeasterly storm strikes.

41. There is a lack of naturally deep anchorage. Low tide stages cause boats anchored in shallow areas to go aground and lose all or part of a fishing day.

42. The U.S. Fish and Wildlife Service reports that elimination of tidal and storm delays would increase annual fish landings by the following amounts:

Type of Fish	Increased Catch	Value as of 3/69
Lobster	20,000 pounds	$ 16,000
Scallops	4,800 pounds	3,600
Groundfish	30,000 pounds	2,000
	Total	$ 21,600

43. A general economic expansion and price inflation has taken place since the estimate was made. In order to properly compare the value of the increased fish catch with the cost of dredging, both quantities must reflect current price levels. Accordingly, the value of the fish catch as of March 1969 was increased 5% to reflect November 1970 price levels. Hence the value of the increased fish catch is estimated to be $22,600. Additional operating costs such as fuel, labor, extra traps, lines and bait are estimated to be 20% of the gross value of the catch. This results in a net annual benefit of 80% x $22,600 or $18,100.

44. Ice damage to boat hulls is reported to be $6,000 annually. If an 8-foot (mlw) anchorage were provided, the Coast Guard ice breaker which draws 9.5 feet could keep the harbor relatively free of ice. It is estimated that at least 50 percent of the ice damage could be eliminated for an annual savings of $3,000.

45. Paragraph 5 of ER 1165-2-6 and Paragraph V.A. 3 of Senate Document 97 provide that wages paid to local unemployed or underemployed persons in a designated Redevelopment Area under Public Law 89-136 can be considered as project benefits. Washington County, Maine has been designated a Title IV (1) Redevelopment Area. Wages paid to local unemployed or underemployed labor are estimated to be $18,000 resulting in average annual benefits of $800. The following table shows details of wages and benefit determination.

Type of Labor	Average Hourly Rate	Man-hours Required for Project Const.	Wages	% Paid to Local Workers	Wages to Local Workers
Skilled	$ 5.45	2,660	$14,500	20%	$ 2,900
Semi-skilled	4.85	1,710	8,300	30%	2,500
Unskilled	4.05	3,460	14,000	90%	12,600
	TOTAL	7,830	$36,800		$ 18,000

It is estimated that the workers involved would have been employed at various other jobs 25% of the time so additional wages resulting from the project would be 75% of $18,000 or $13,500. The average annual equivalent at 5-1/8% capital recovery for a 50-year project life is 0.05584 x $13,500 or $800. Similar benefits from the maintenance dredging are too small to be of any significance and have not been considered.

46. A summary of annual benefits expected from the proposed project is:

Summary of Benefits

Reduction in Boat Damages From:	
Storms	$ 2,000
Ice Floes	3,000
Increased Fish Catch	18,100
Redevelopment Benefits	800
TOTAL ANNUAL BENEFITS	$23,900

COMPARISON OF BENEFITS & COSTS

47. Estimated annual benefits of $23,900 and estimated annual charges of $21,500 result in a benefit-cost ratio of 1.11 to 1.0.

PROPOSED LOCAL COOPERATION

48. The benefits expected to be derived from the proposed improvement are entirely general in nature. Therefore, no local cash contribution toward the first cost of construction is required. Local interests would be required to do the following:

a. Provide, operate and maintain without cost to the United States, a public landing with adequate parking area and supply facilities open to all on equal terms;

b. Provide and maintain access channels to and berthing areas at all wharves adjacent to the proposed anchorage with depths commensurate with those in the anchorage;

c. Hold and save the United States free from damages which may result from the construction and subsequent maintenance of the project;

d. Provide without cost to the United States all lands, easements and rights-of-way required for construction and subsequent maintenance of the project;

e. Regulate the use, growth and development of the harbor facilities with the understanding that they will be open to all on equal terms;

f. Establish regulations prohibiting discharge of untreated sewage, garbage and other pollutants in the waters of the harbor by users thereof, which regulations shall be in accordance with applicable laws or regulations of Federal, State and local authorities responsible for pollution prevention and control.

49. Local authorities have indicated that the above requirements of local cooperation would be met (see APPENDIX B).

COORDINATION WITH OTHER AGENCIES

50. All Federal, State and local agencies which might have an interest in navigation improvements to Bucks Harbor were notified of the public hearing. The U.S. Fish and Wildlife Service was consulted and it submitted a conservation and development report in cooperation with the Maine Department of Sea and Shore Fisheries. The report is included as APPENDIX A. Comments of the State of Maine Port Authority and the town of Machiasport are contained in APPENDIX B.

SCHEDULE FOR DESIGN AND CONSTRUCTION

51. Preparation of contract plans and specifications for the project is expected to take four months and cost $18,000. Construction would be under a single contract and could be completed in four months. Total expenditures are:

a. Allocated to date:

Reconnaissance Report	$ 2,500
Detailed Project Report	20,000
Sub-Total	$ 22,500

b. Required to Complete:

Plans and specifications	$ 18,000
Construction, engineering during construction, supervision & administration	229,000
Sub-Total	$247,000
Total Cost (Corps of Engineers)	$269,500

OPERATION AND MAINTENANCE

52. Maintenance of the improvement will be the responsibility of the United States. It is estimated that maintenance dredging will be required about every ten years. The average annual cost for this maintenance is estimated to be $7,700.

CONCLUSIONS

53. Detailed study indicates that a navigation improvement at Bucks Harbor, Machiasport, Maine under Section 107 of the 1960 River and Harbor Act is feasible and economically justified. The resulting benefits to the commercial fishing fleet are sufficient to warrant a Federal improvement project that would provide an 11-acre anchorage 8 feet deep, in the outer harbor. Local interests have indicated that the improvement meets their needs and are willing and able to meet the requirements of local cooperation. All agencies known to have an interest in the study have been consulted and have expressed no objections to the improvement.

RECOMMENDATIONS

54. The Division Engineer recommends that a Federal navigation project at Bucks Harbor, Machiasport, Maine be authorized by the Chief of Engineers under the provisions of Section 107 of the River and Harbor Act of 1960, as amended in 1965. The project would provide an anchorage of 11 acres, 8 feet deep in the outer harbor. The total Federal project cost is estimated to be $247,000. Annual maintenance costs are estimated to be $7,700. The recommendation is made subject to conditions that local interests will:

a. Provide, maintain and operate without cost to the United States, a public landing, with adequate parking area and supply facilities open to all on equal terms;

b. Provide and maintain access channels to and berthing areas at all wharves adjacent to the proposed anchorage, with depths commensurate with those in the anchorage;

c. Hold and save the United States free from all damages which may result from the construction and subsequent maintenance of the project;

d. Provide without cost to the United States, all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project;

e. Regulate the use, growth and free development of the harbor facilities with the understanding that they will be open to all on equal terms;

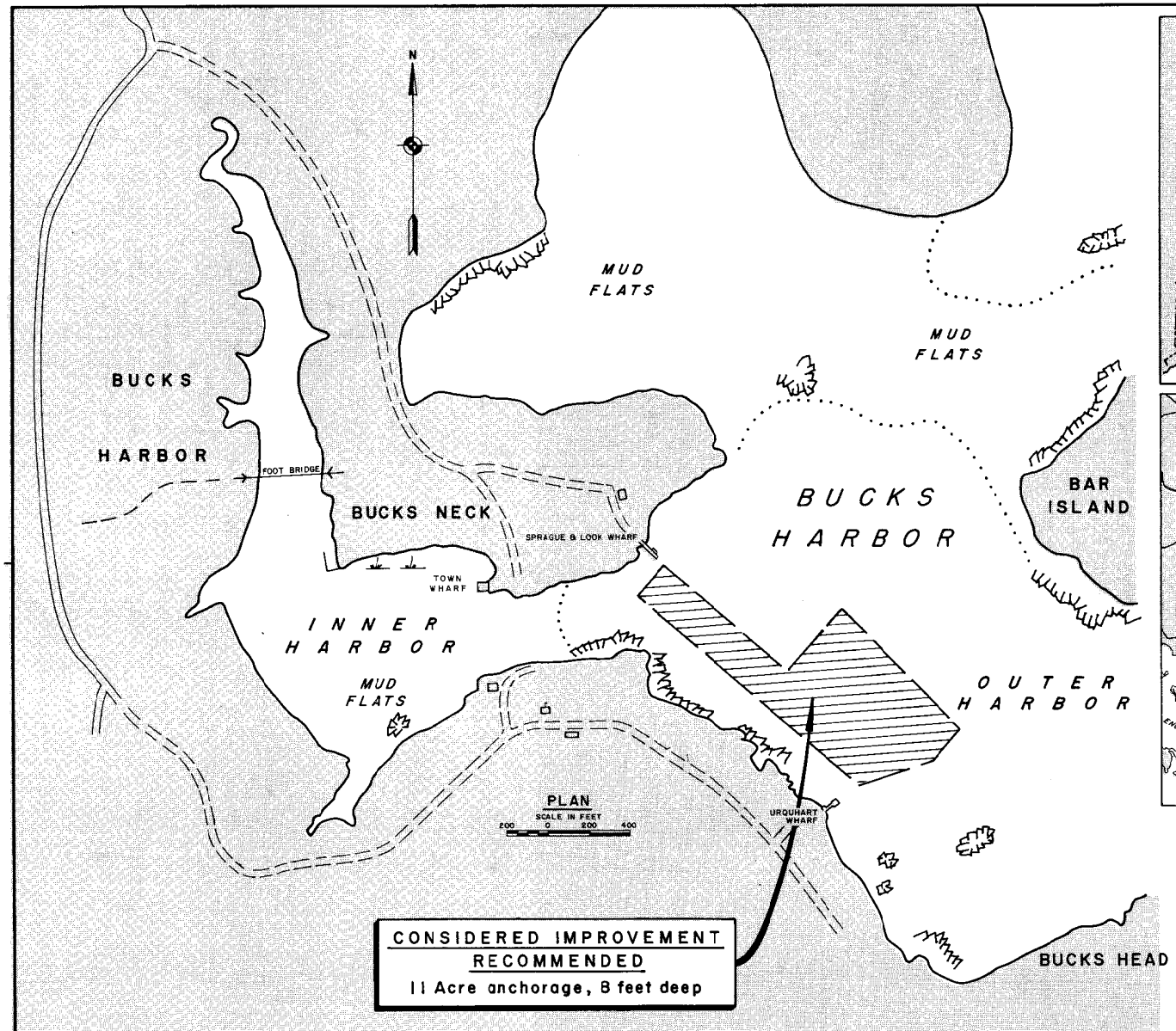
f. Establish regulations prohibiting discharge of untreated sewage, garbage, and other pollutants in the waters of the harbor by users thereof, which regulations shall be in accordance with applicable laws or regulations of Federal, State and local authorities responsible for pollution prevention and control.

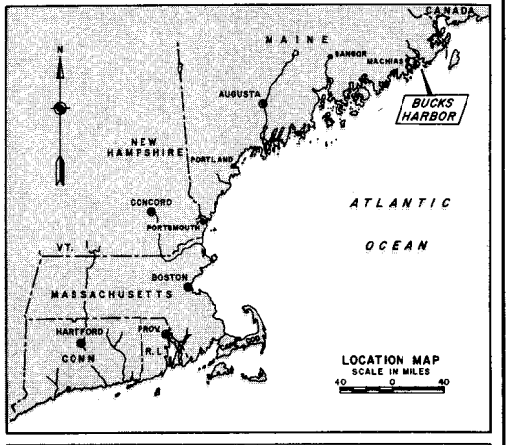
3 Incl
1. Maps - 2 Plates
2. Appendix A
3. Appendix B

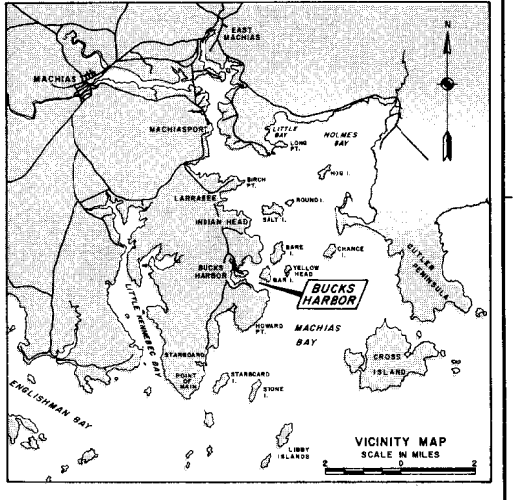
FRANK P. BANE
Colonel, Corps of Engineers
Division Engineer

CORPS OF ENGINEERS

U. S. ARMY







REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DR. BY	TR. BY	CH. BY
ALD	ALD	

SURVEYS
PROJECT ENGINEER
CHIEF, COASTAL DEVELOPMENT SECT.

BUCKS HARBOR
MACHIASPORT, MAINE
GENERAL MAP

APPROVAL RECOMMENDED
CHIEF, PLANNING BRANCH

APPROVED
CHIEF, ENGINEERING DIVISION

DATE JAN. 1971

TO ACCOMPANY DETAILED PROJECT REPORT
DATED: 18 JAN. 1971

SCALE AS SHOWN

DRAWING NUMBER
1927 D-8-2

SHEET 1 OF 1

PLATE 1

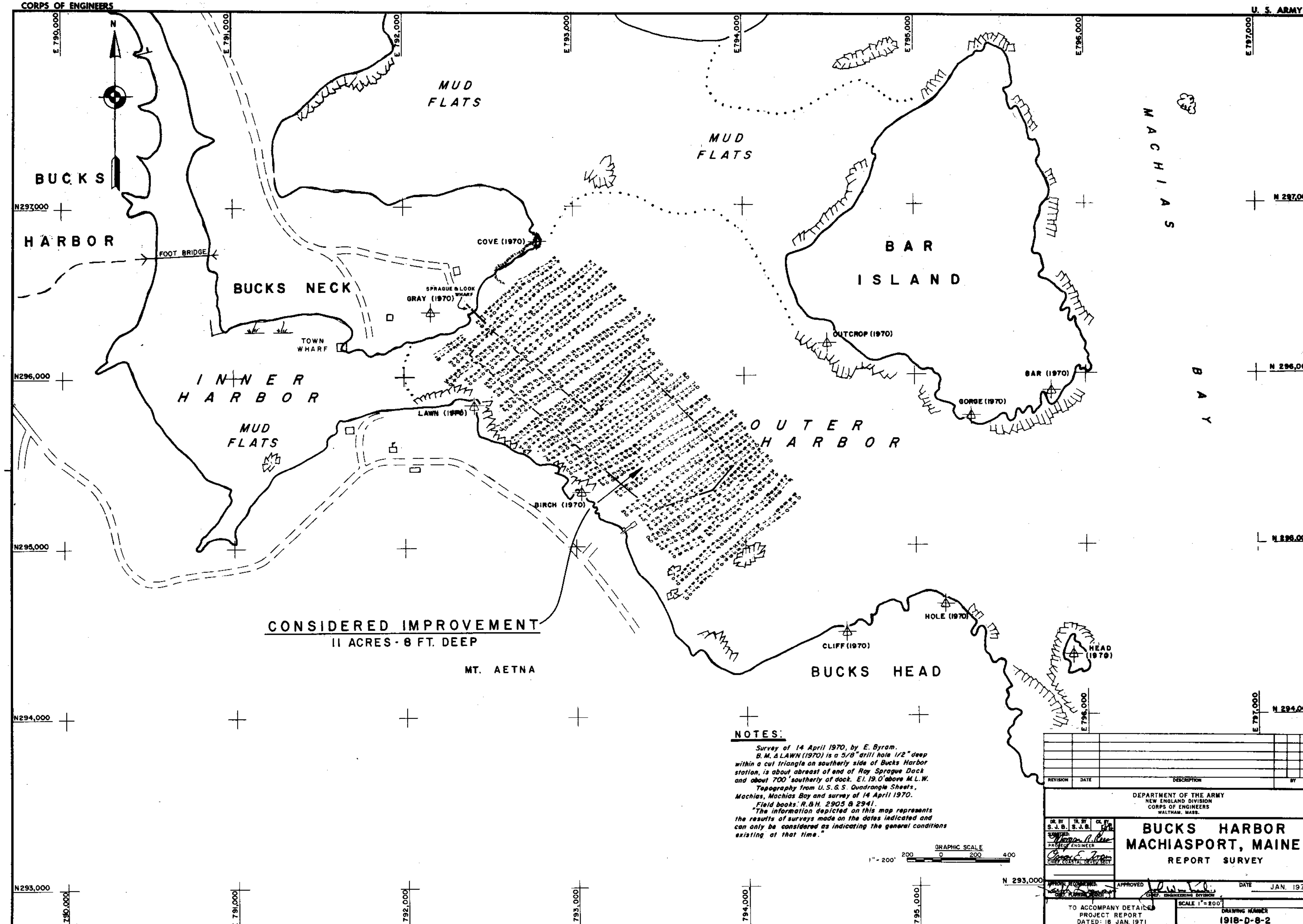

CORPS OF ENGINEERS
U. S. ARMY
N
BUCKS
HARBOR
FOOT BRIDGE
BUCKS NECK
MUD FLATS
MUD FLATS
COVE (1970)
SPRAGUE & LOOK WHARF
GRAY (1970)
TOWN WHARF
INNER HARBOR
MUD FLATS
LAWN (1970)
BIRCH (1970)
BAR ISLAND
OUTCROP (1970)
BAR (1970)
GORGE (1970)
MACHIAS BAY
OUTER HARBOR
CONSIDERED IMPROVEMENT
11 ACRES - 8 FT. DEEP
MT. AETNA
BUCKS HEAD
CLIFF (1970)
HOLE (1970)
HEAD (1970)
E 790,000
E 791,000
E 792,000
E 793,000
E 794,000
E 795,000
E 796,000
E 797,000
N 297,000
N 296,000
N 295,000
N 294,000
N 293,000
NOTES:
Survey of 14 April 1970, by E. Byram.
B. M. Δ LAWN (1970) is a 5/8" drill hole 1/2" deep within a cut triangle on southerly side of Bucks Harbor station, is about abreast of end of Roy Sprague Dock and about 700' southerly of dock. El. 19.0' above M. L. W.
Topography from U. S. G. S. Quadrangle Sheets, Machias, Machias Bay and survey of 14 April 1970.
Field books: R. & H. 2905 & 2941.
"The information depicted on this map represents the results of surveys made on the dates indicated and can only be considered as indicating the general conditions existing at that time."
GRAPHIC SCALE
1" = 200'
200 0 200 400
REVISION DATE DESCRIPTION BY
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.
DR. BY S. J. B.
TR. BY S. J. B.
CK. BY
SUBMITTED:
PROJECT ENGINEER
CHIEF, COASTAL DEVEL. SECT.
BUCKS HARBOR
MACHIASPORT, MAINE
REPORT SURVEY
APPROVAL RECOMMENDED:
CHIEF, PLANNING BRANCH
APPROVED
CHIEF, ENGINEERING DIVISION
DATE JAN. 1971
SCALE 1" = 200'
TO ACCOMPANY DETAILED PROJECT REPORT DATED: 18 JAN. 1971
DRAWING NUMBER
1918-D-8-2
SHEET 1 OF 1

PLATE 2

APPENDIX A

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
U. S. POST OFFICE AND COURTHOUSE
BOSTON, MASSACHUSETTS 02109

July 2, 1969

Division Engineer
New England Division
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

This is our conservation and development report on navigation improvements for Bucks Harbor (Washington County), Maine, which are being studied under authority of Section 107 of the River and Harbor Act approved July 14, 1960, as amended in 1965. Our report was prepared under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-666 incl.), in cooperation with the Maine Department of Sea and Shore Fisheries and has its concurrence as indicated by letter dated June 30, 1969. It has also been coordinated with and represents the views of the Bureau of Commercial Fisheries.

We understand the dredging of a 12-acre anchorage to a depth of 8 feet is being considered.

Forty lobster boats and four draggers moor and land their catch in Bucks Harbor. Because of crowded harbor conditions, approximately 20 of the lobster boats must moor in shallow water and are unable to depart at low tide.

During storms, particularly when accompanied by southeasterly winds, the harbor is virtually unprotected and many boats are subjected to heavy pounding. To avoid damage, lobstermen must move their boats into the shallow inner harbor area before a storm. This is usually done the day before a storm since they can reach the inner harbor only during a high tide. Often a single storm results in the loss of three to five days of lobster fishing.

Since it is impossible for Coast Guard ice-breakers to enter the shallow harbor and free ice-bound fishing boats, additional fishing time is lost during the winter.

A deeper harbor will eliminate tidal and ice delays and materially benefit commercial fishery activities. It is estimated that the navigation improvements will yield an average annual increase in landings amounting to 20,000 pounds of lobsters (gross value, $16,000), 4,800 pounds of scallops (gross value, $3,600), and 30,000 pounds of groundfish (gross value, $2,000).

The mud flats west and north of the anchorage are heavy soft-clam producing areas and should not be used for spoil disposal. It appears that it would be desirable to place the spoil material in an offshore area. This Service and the Maine fish and game agencies will work with you during the advance planning and design stage in the selection of a spoil area (onshore or offshore).

We recommend --

1. That the selection of a spoil disposal area (onshore or offshore) be coordinated with this Service and the Maine fish and game agencies during the advance planning and design stage.

We appreciate the opportunity to report on the project.

Sincerely yours,

Thomas A. Schrader

Assistant Regional Director

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
U. S. POST OFFICE AND COURTHOUSE
BOSTON, MASSACHUSETTS 02109

AUG 2 0 1971

Division Engineer
New England Division
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

Reference is made to Mr. Leslie's May 19 request for data substantiating fishery estimates which appear in our July 2, 1969 Conservation and Development Report on the Bucks Harbor navigation project, Machiasport, Maine. The inquiry, directed to our Concord, New Hampshire area office, requested information on the catch per boat per day, delay hours per storm, and the number of storms per year.

As stated in our 1969 report, there are forty lobster boats and four scallop draggers mooring in Bucks Harbor. In 1967, harvest amounted to 200,000 pounds of lobster valued at $160,000, 4,800 pounds of scallops valued at $3,600, and 30,000 pounds of groundfish valued at $2,000.

Based on availability of the lobster resources, a 10% increase in lobster catch is anticipated as a result of harbor improvements. Catch per boat per day is determined by pro-rating the projected 10% increase (20,000 pounds of lobster) to the number of boat-days expended in lobster fishing. Of the 40 boats fishing for lobster, 28 fish a 250 day season and the remaining 12 fish a 200 day season. Time expended in fishing depends upon whether the boat fishes the year-around or is seasonal and, in part, reflects time lost to storms; usually four to six storms occur each year and each storm delays fishermen from five to six days. The accumulative lobster fishing effort amounts to 9,400 boat days. Figured from the above, harvest increases with the navigation improvements amount to 2.13 pounds per boat day. In monetary terms, based on a 1967 market value of lobster at .80¢ a pound, increased income per boat day amounts to $1.70; net dollar benefits for the entire fleet were estimated at $16,000 annually.

Ice and tidal delays resulted in a loss of about 12 fishing days for each scallop dragger in 1967. Catch per day per boat, in 1967, including scallops and ground fish was valued at approximately $115.

Navigation improvements and a deeper harbor will make it possible for the existing scallop draggers to fish another 12 days a year thereby increasing their annual income by $1,280. Benefits derived by all four draggers amount to approximately $5,600.

The evaluation of fishery benefits for the Bucks Harbor navigation project was based on market prices in 1967. The net benefits attributed to the project represent gross revenue received at both the fisherman and processing levels less associated costs and wage payments to the fisherman.

We trust this meets your requirements for substantiating information.

Sincerely yours,

Richard E. Griffith

Regional Director

LD W. GREEN, COMMISSIONER

STATE OF MAINE

DEPARTMENT OF SEA AND SHORE FISHERIES

STATE HOUSE

AUGUSTA, MAINE 04330

December 14, 1970

Division Engineer
New England Division
U. S. Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts

Dear Sir:

Reference is made to a telephone request from your office this date for comments by this Department on the proposed dredging project at Bucks Harbor, Maine.

Please be advised that the proposed dredging of an 11-acre anchorage with an 8-foot depth at Bucks Harbor should result in substantial benefits to Maine's commercial fisheries and to the local economy. At the State level, therefore, we would like to go on record as supporting this project, reaffirming our statement to this effect submitted at the Public Hearing.

It is our understanding that further information will be forthcoming from the Corps of Engineers at a later date regarding the disposition of spoil materials from this project. We shall, therefore, reserve comment on this subject until such a time as a specific spoil disposal site is proposed.

Sincerely,

Ronald W. Green
Commissioner

RWG:ec

Town of Machiasport

Machiasport, Maine 04655

December 31, 1970

Division Engineer
New England Division
U.S. Army Corps of Engineers
424 Trapels Road
Waltham, Mass. 02154

Re: Navigation Improvements
Bucks Harbor
Machiasport, Maine 04655

Gentlemen:

On December 10, 1970, Mr. Morgan Rees of the New England Division, U.S. Army Corps of Engineers informed members of the Board of Selectmen of Machiasport of the results of the Corps of Engineers study of navigation improvements to Bucks Harbor.

The Board of Selectmen, and Harbormaster have carefully considered the proposed plan of improvement and alternate plans. We hereby endorse the report recommendation of an eleven acre anchorage, eight feet deep along the southwest shore of the harbor. We will comply fully with the items of local cooperation set forth in the report with regard to public landing facilities, access channels, berthing areas, lands, easements, responsibility for damages, and pollution considerations.

Sincerely,

Selectmen of Machiasport

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
U. S. POST OFFICE AND COURTHOUSE
BOSTON, MASSACHUSETTS 02109

NOV 8 1971

Division Engineer
New England Division
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

Mr. Leslie's letter of September 15, 1971, requested our comments on a revised draft of the environmental statement dated September 8, 1971, prepared for the Bucks Harbor navigation project at Machiasport, Washington County, Maine. The environmental statement draft adequately describes and discusses the impacts of the project upon fish and wildlife resources and we have no comments to contribute.

We would appreciate receiving a copy of the statement in the form in which it will be sent through channels.

This letter supersedes our letter of July 9, 1971, concerning the same project.

Sincerely yours,

Richard E. Griffith

Regional Director

1871 1971

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
John F. Kennedy Federal Building - Room 2303
Boston, Massachusetts 02203

March 30, 1972

Mr. John Wm. Leslie
Chief, Engineering Division
New England Division
Corps of Engineers
U. S. Dept. of the Army
424 Trapelo Road
Waltham, MA 02154

Dear Mr. Leslie:

We have reviewed the environmental test data on the sediments from the proposed improvement dredging of Bucks Harbor, Maine. We note that in this project, the material to be dredged falls within the guideline criteria parameters. Therefore, we have no objections to the disposal of this material at an approved, existing ocean dump site.

Thank you for the opportunity to comment.

Sincerely yours,

Edward J. Conley
Chief, Refuse Act
Permit Program

RONALD W. GREEN, COMMISSIONER

STATE OF MAINE
DEPARTMENT OF SEA AND SHORE FISHERIES
STATE HOUSE
AUGUSTA, MAINE 04330

February 18, 1971

John Wm. Leslie
Chief, Engineering Division
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Leslie:

This is in reference to your letter of February 4, 1971, and the environmental statement concerning the Bucks Harbor Project, Machiasport, Maine.

We concur generally with the content of this statement, and appreciate the opportunity to review your report on this project.

Very truly yours,

RONALD W. GREEN
Commissioner

RONALD W. GREEN, COMMISSIONER

STATE OF MAINE
DEPARTMENT OF SEA AND SHORE FISHERIES
STATE HOUSE
AUGUSTA, MAINE 04330

September 27, 1971

Mr. John Wm. Leslie
Chief, Engineering Division
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Leslie:

Thank you for your letter of September 14, and for the copies of the revised draft of your environmental statement on the proposed navigation improvement project for Buck's Harbor, Maine, (reference NEDED-R).

As far as can be determined, there is no change in this Department's position, as stated in our letter to you of February 18 of this year.

Very truly yours,

RONALD W. GREEN
Commissioner

RWG/abr

STATE OF MAINE
ENVIRONMENTAL IMPROVEMENT COMMISSION
AUGUSTA, MAINE 04330

September 29, 1971

John Wm. Leslie
Chief Engineering Division
Dept. of the Army
New England Division
Corps of Engineers
424 Trapelo Rd.
Waltham, Mass. 02154

Re: Environmental Impact Statement

Dear Mr. Leslie:

At its regular meeting of September 24, 1971, the Environmental Improvement Commission agreed to approve the project at Bucks Harbor, Machiasport, Maine.

Sincerely,

Paul Sova, Chief
Bureau of Oil Pollution Control
ENVIRONMENTAL IMPROVEMENT
COMMISSION

PS/dc

cc: Environmental Protection Agency
Boston, Mass.

STATE OF MAINE
OFFICE OF THE GOVERNOR
AUGUSTA, MAINE
04330

KENNETH M. CURTIS
GOVERNOR

August 28, 1972

Colonel John H. Mason
Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Mason:

Reference is made to your letter of August 11 regarding the proposed navigation improvements to Bucks Harbor, Machiasport, Maine.

Please be advised that we at the State level are pleased to learn that it has been determined by the Corps of Engineers that the economic benefit to the fishing fleet is sufficient to justify providing a Federal anchorage in Bucks Harbor. We concur with the proposal as submitted and believe it may assist our commercial fishing industry.

While we have no reservations about this project, we do assume that the Corps will follow the recommendations of the Maine Department of Sea and Shore Fisheries regarding a minor change in the location of the spoil disposal site and regarding monitoring of the spoil disposal operations.

The opportunity to comment on this project is appreciated.

Sincerely,

Kenneth M. Curtis
Governor

KMC:lh

cc: S. Apollonio

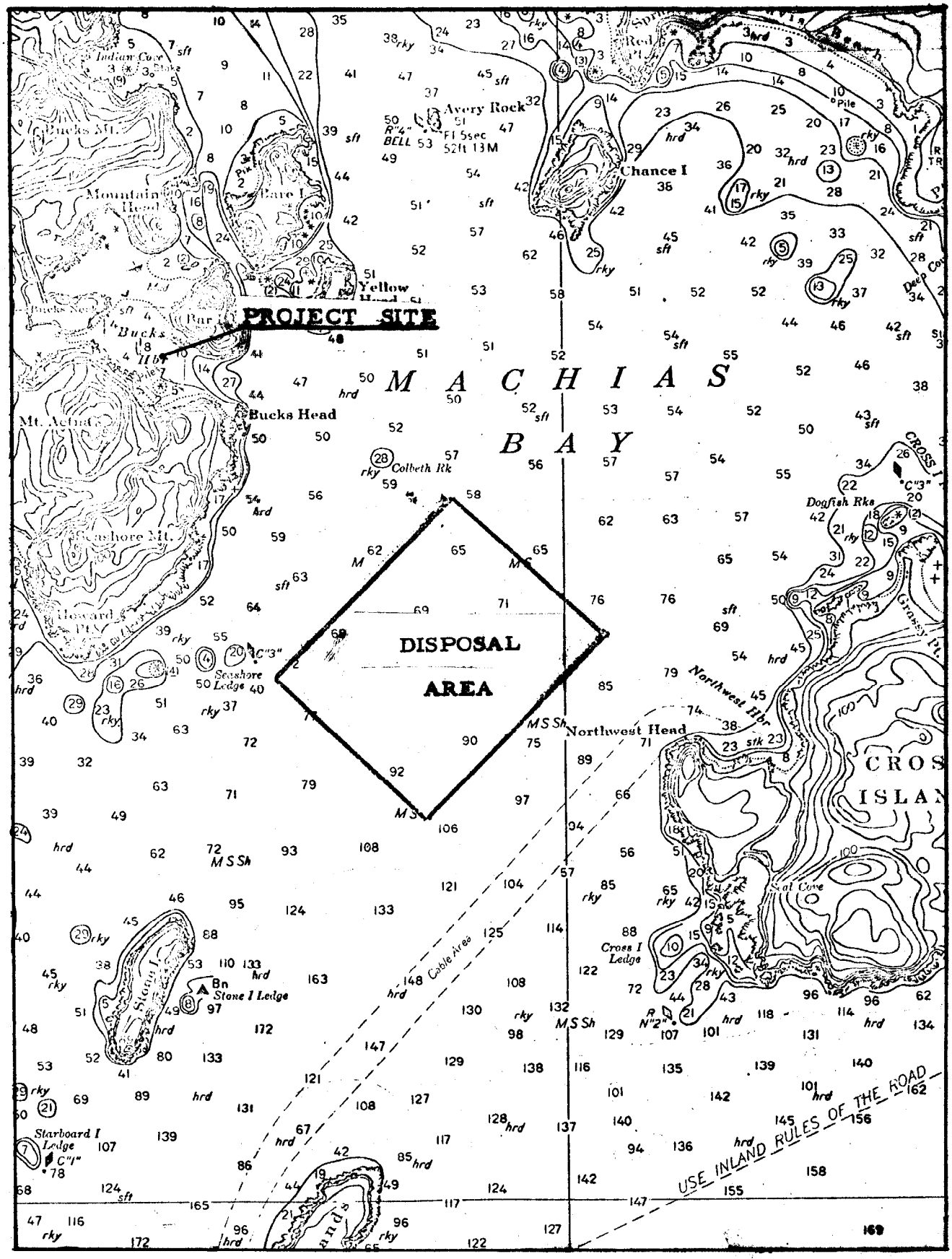


FIGURE 1

DISPOSAL AREA

R 10/72